Happiness, well-being and inequalities

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Traditionally, the well-being of countries and regions was analyzed by focusing mainly on production indicators. However, in recent years the quality of life and the social and institutional efficiency are recognized equally important in the evaluation of the progress of different countries.

Research in this field intensified after the publication of the Report by the Commission on the Measurement of Economic Performance and Social Progress chaired by Joseph Stiglitz (Stiglitz et al. 2009). Starting from the tenet that "what we measure affects what we do" (p. 7), the report stresses the belief that the use of wrong indicators can produce wrong decisions.

Alongside this interest for the definition of better measures of objective well-being, there is an increasing concern on how satisfied people feel about their life. Does objective well- being overlap subjective perceptions of happiness? Do these measures exhibit the same inequalities traits?

Answer these questions is the aim of the paper, in order to bridge empirical research on subjective and objective well-being. In economists' researches, the analyses on happiness and on aggregate measures of well-being have been carried out separately. On one hand, a huge empirical literature draws upon information from surveys collecting individual responses to questions such as: "how happy are you with your life?" Applied research has found robust relationships between these measures of revealed degree of happiness and individual characteristics across countries (Blanchflower and Oswald, 2011). On the other hand, in the last two decades economic literature was enriched by a very high number of contributions attempting at measuring objective well-being in a broader sense than per capita GDP. As it is well known, many scholars and international organizations share the belief that GDP is an indicator of economic activity, whereas it is neither a sufficient nor a proper measure of well-being as a multidimensional phenomenon (Stiglitz et al. 2009). In order to pursue the goal of defining alternative measures to GDP, several approaches have been proposed (Fleurbaey 2009). Among these latter, composite indicators are widely used. As the first approach is to listen what human beings say and the latter is to calculate indicators based on macro-level variables, subjective and objective well-being appear sometimes not connected to each other. The aim of this paper is, therefore, to fulfill this gap, investigating the causal relationship between happiness and a synthetic indicator of well-being. Moreover, the paper aims to investigate how much European regions differ in terms of both well-being and happiness perception, by using three inequality measures: the coefficient of variation, the Gini and the Theil Indices.

The units of analysis are the European NUTS 2 regions and the data come from several sources from within the European Statistical System (ESS), in particular SILC (statistics on income and living conditions), LFS (labour force survey), EHIS (European Health Interview Survey), and administrative sources. The data are organised along the following nine dimensions: Material living conditions, Productive or main activity, Health, Education, Leisure and social interactions, Economic and physical safety, Governance and basic rights, Natural and living environment and Overall experience of life. The "overall experience of life" refers to the personal perception of quality of life (i.e. life satisfaction, affects, meaning of life).

The empirical analysis can be divided into 3 steps: at the first step a composite well-being indicator is constructed by using Principal Components Analysis (PCA). PCA is a multivariate statistical method particularly suitable for reducing variables into a small number of transformed dimensions, yet capturing all relevant information (Morrison, 2005; Hair et al. 2014). The principal component analysis extract synthetic measures from a set of variables by transforming them into a new, smaller set of uncorrelated variables, the principal components, capturing most of the variation present in the original data. Although as many

components as v variables in the data set are required to reproduce the total variability, much of this variability can be accounted for by a small number of p principal components. Thus, the p principal components can replace the v variables without much loss of information and with the advantage that the original data set is reduced in p<v principal components. The principal components are given by the uncorrelated linear combination of the original variables whose variances are as large as possible. The first principal component is the normalized linear combination with maximum variance. Each of the subsequent principal components is the normalized linear combination of the original variables with the maximum variance subject to the constraint of being orthogonal to the previous component. As we consider many dimensions of well-being, each describing a particular aspect by means of a set of observable indicators, the principal component analysis allows us to reduce the initial large number of variables in a smaller set of indicators. Moreover, we use the principal component analysis also for checking for internal consistency of each well-being dimension. This methods, indeed,nallows us to detect non-influencing indicators. Furthermore, by using the principal component analysis we can avoid to choose arbitrarily a weighting scheme for aggregating variable or sub-indices. Thus, our strategy is to use the principal component analysis in order to obtain, firstly, a synthetic indicator of each well-being dimension and, secondly, an overall synthetic indicator of well-being by applying again the principal component analysis using the indicators previously obtained, as new variables.

In the second step, are the composite well-being indicator and happiness variable are linked by applying a multilevel modeling strategy. Multilevel modeling well fits our data in reason of their nested structure in at least three level (individuals, regions and time). Multilevel models address the existence of these data hierarchies by allowing for residual components at each level in the hierarchy. One interesting property of multilevel models is their attitude to separately estimate the predictive effects of an individual predictor (direct effect) and its group-level mean (contextual effect, Gelman 2006).

Finally, taking advantage of the measure objective and subjective well-being computed above, we investigate regional disparities in terms of objective and subjective well-being by calculating three inequality indices (the coefficient of variation, the Gini and the Theil Indices) for both well- being and happiness. In economic literature only few papers have analysed inequalities in well-being by considering jointly social factors and economic indicators, albeit we have no reason to expect the same inequalities trends when income and non-income well-being dimensions were considered (Bourguignon and Morris 2002, Decancq et al. 2009; Pillarisetti 1997; McGillivray and Pillarisetti 2004; McGillivray and Markova 2010).

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